Mobile Technology Testing – Are You Ready?

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Agenda

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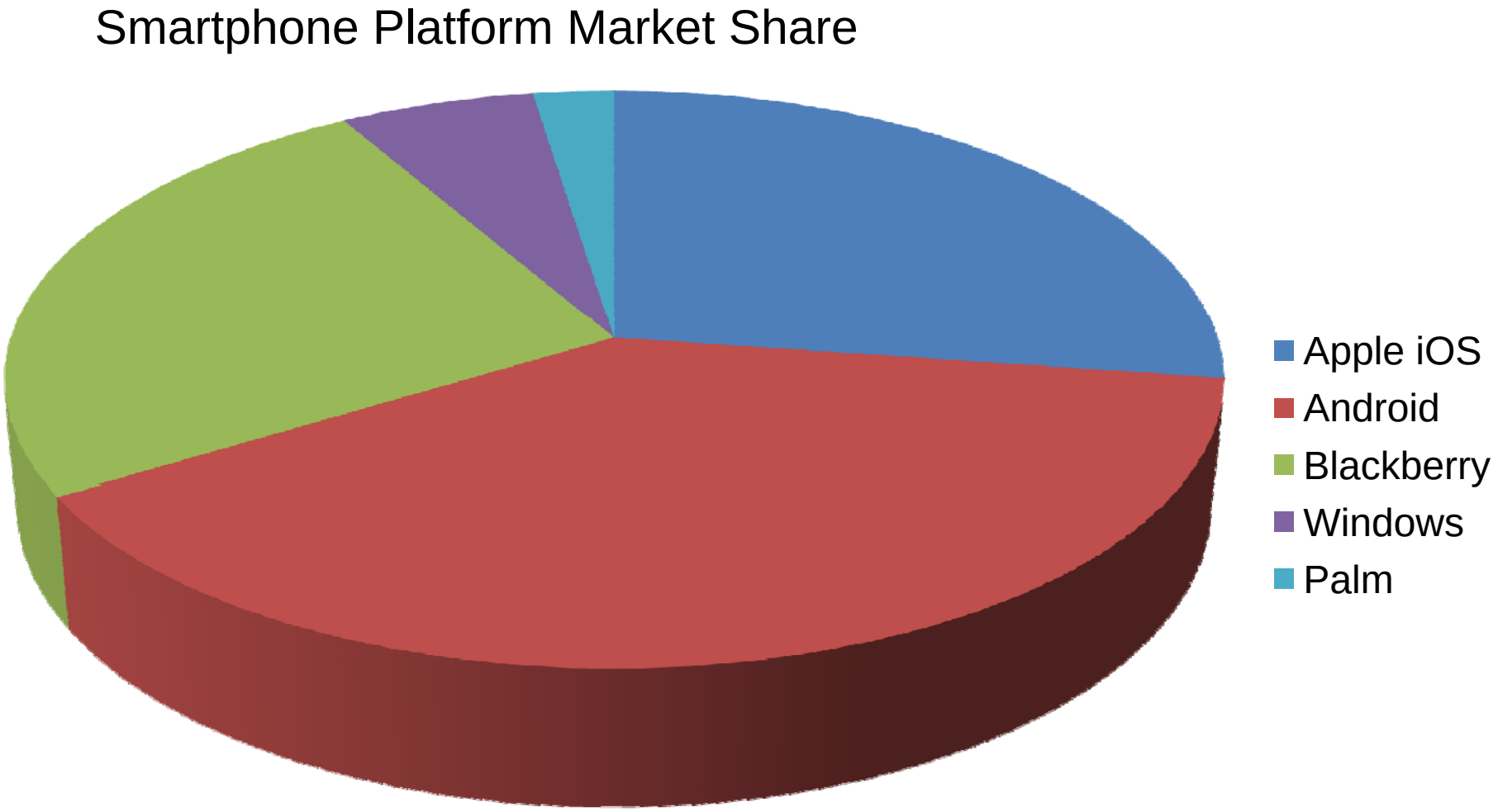
1. Mobile Testing Challenges
2. Mobile Testing Practices
3. Mobile Test Automation
4. Summary and Q & A

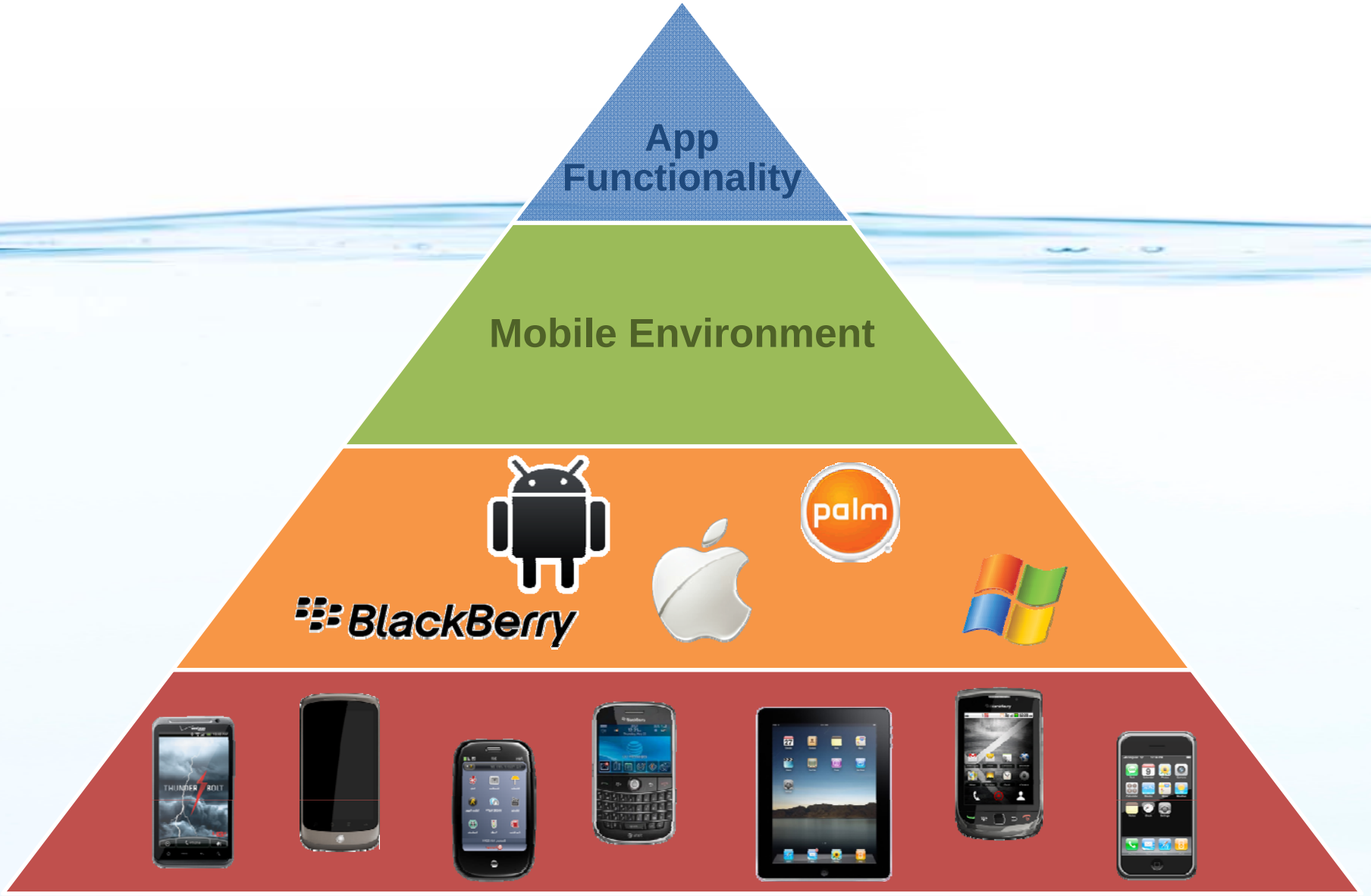
Mobile Testing Challenges

Mobile Testing Challenges – Platform Fragmentation



Source: comScore Reports May 2011 Smartphone Platform Market Share

Mobile Testing Challenges – Increased Test Burden



Mobile Testing Challenges – Human Factors & Technology

Factor	Traditional App Testing	Mobile App Testing
Test Platform	Desktop / notebook	Mobile device
User Input	Keyboard / mouse	Touch screen
Collaboration	Screen sharing	?
Results Verification	Screen capture / movie	?
Testing Utilities?	Yes	?
Automated Execution?	Yes	?
Performance Testing?	Yes	?
System Monitoring?	Yes	?

Mobile Testing Practices

Understand the Mobile Landscape

- Mobile Industry Sources
- Mobile Technology
- Testing Techniques and Tools

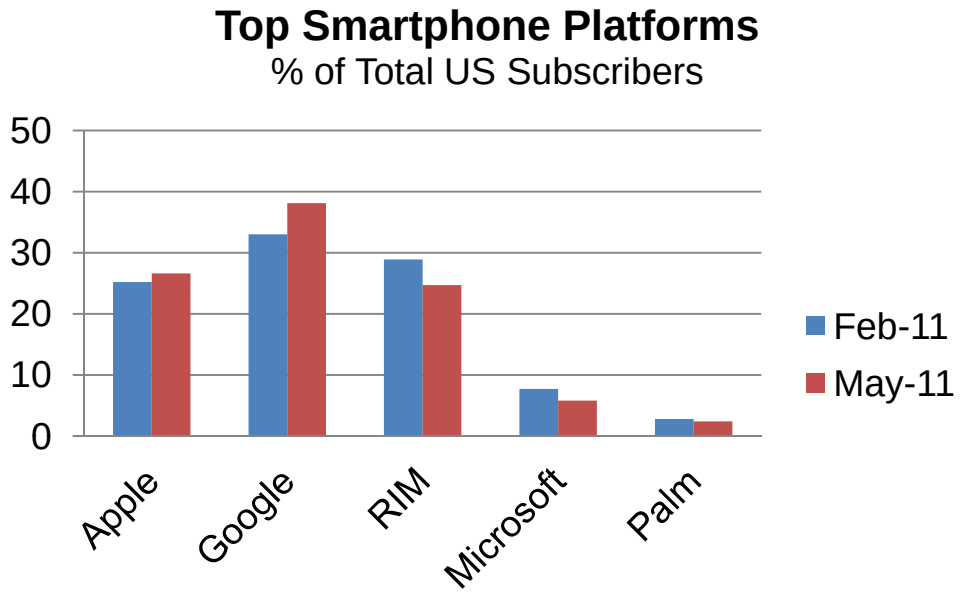
Mobile Industry Sources

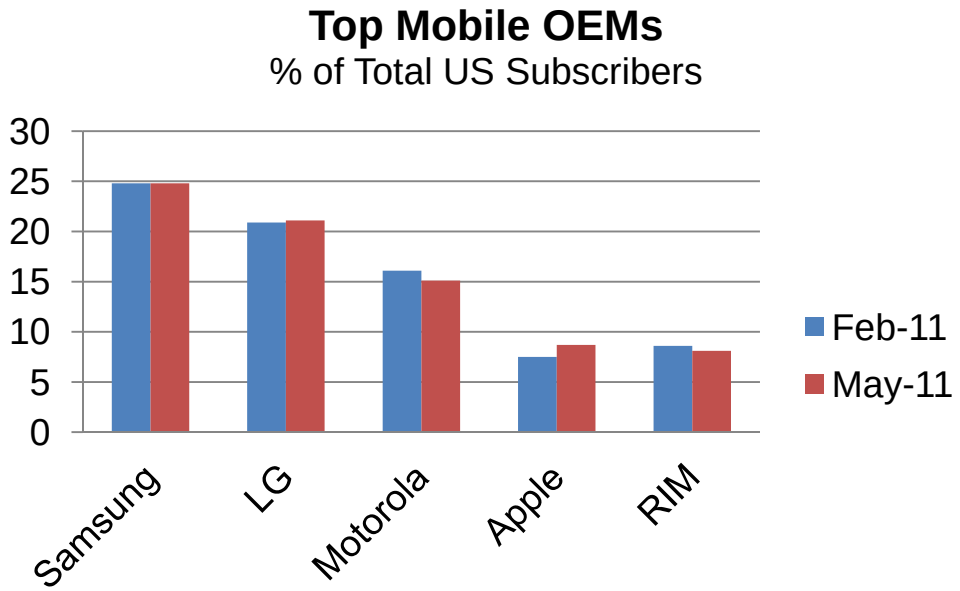
General Industry

- Analyst reports (Gartner, IDC, etc.)
- Mobile specific analysts, blogs
- Platform vendor reports

Organization / App Specific

- System monitoring and analytics
- Business / user groups





Source: comScore Reports May 2011 US Mobile Subscriber Market Share

Mobile Technology

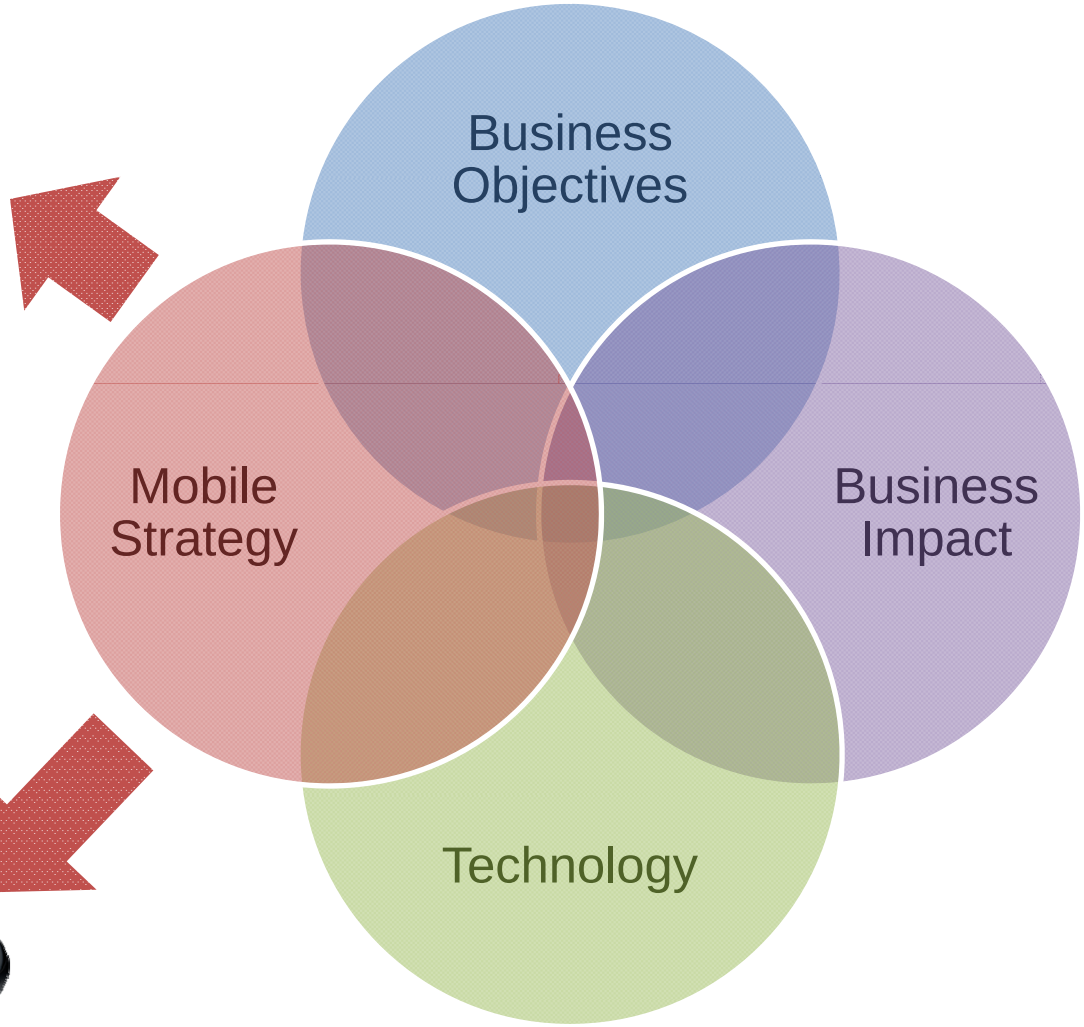
Platforms	Android	iOS	Blackberry	Windows	WebOS
Devices	Various	Apple	Blackberry	Various	HP / Palm
Dev. Language	Java	Objective C	Java	C# / C++ / VB	HTML / CSS / JavaScript
Source Model	Open	Closed	Closed	Closed	Closed
Multi-tasking	Yes	Limited (iOS 4+)	Yes	Limited	Yes
Standard Browser	Webkit Browser	Safari	Blackberry Browser	Varies with Device / Carrier	WebOS Browser

Networks	GSM	CDMA	LTE	HSPA+	WiMAX
Carrier(s)	AT&T, T-Mobile	Verizon, Sprint	Verizon	AT&T, T-Mobile	Sprint
Standard	3G	3G	4G	4G	4G
Typical Avg Speed	1769 / 739 kbps	848 / 506 kbps	6.44 / 5.0 mbps	2.48 / 1.05 mbps	2.15 / .081 mbps
Simultaneous Voice & Data	Yes	No	Yes	Yes	Yes

Mobile App Test Strategy

Test Strategy Based on Mobile Context

- What to test?
- Where to test?
- How to test?



Non-Functional Mobile Test Conditions

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Interrupt

- Incoming Call
- Incoming SMS
- Low battery warning
- Alarm alert
- Power off
- Battery discharge

Network

- Carrier network(s)
- Varying network speeds
- Wi-Fi network
- Network loss
- Network transition

Device

- Accelerometer input
- Keyboard slide
- Handset key mappings
- Screen type/size
- Screen orientation
- GPS
- Camera

Weighted Mobile Configuration Matrix

OS / Device	Device Weighting	iOS 3	iOS4	Android 2.2	Android 2.3	Blackberry 5.0	Blackberry 6.0
OS Weighting		7	9	8	6	5	4
iPhone 3GS	7	49	63	N/A	N/A	N/A	N/A
iPhone 4	9	63	81	N/A	N/A	N/A	N/A
HTC Thunderbolt	8	N/A	N/A	64	48	N/A	N/A
Motorola Atrix 4G	6	N/A	N/A	48	36	N/A	N/A
Blackberry 9700	6	N/A	N/A	N/A	N/A	30	24

Primary Configuration Secondary Configuration

Testing on Emulator vs. Device

Type of Test	Emulator	Device
Unit	Yes	No
Functional / System	Maybe	Yes
System Integration	No	Yes
Non-Functional	No	Yes
Usability Testing	No	Yes
Field Testing (e.g. location based functionality)	No	Yes
Performance (device or system)	No	Yes

Mobile Test Tools

	Mobile Cloud	Test Automation	Emulators
Primary Purpose	Provide remote access to wide range of devices and carriers from your desktop	Provide automated testing capabilities to the mobile platform	Provide a mobile testing environment independent of the physical device
Benefits	Eliminates the need to procure and manage devices Increases test efficiency via built-in utilities (screen/video capture, publishing results, etc.)	Address the large testing burden associated with deploying mobile apps across diverse platforms and devices	Emulate various mobile environments without the need for physical devices Test application functionality in a desktop environment
Vendors	DeviceAnywhere Perfecto Mobile	Jamo Solutions Zap-Fix eggPlant	Mobile OS vendors, OEMs and carriers Many 3rd parties
Notes	Focus is on manual testing – most vendors have some automation capability	Automation approach and capabilities vary widely	Many test conditions cannot be effectively tested on an emulator

Mobile Test Automation

Test Automation Success Criteria

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Reliable

- Issue detection and recovery
- Accurate verification
- Unattended execution

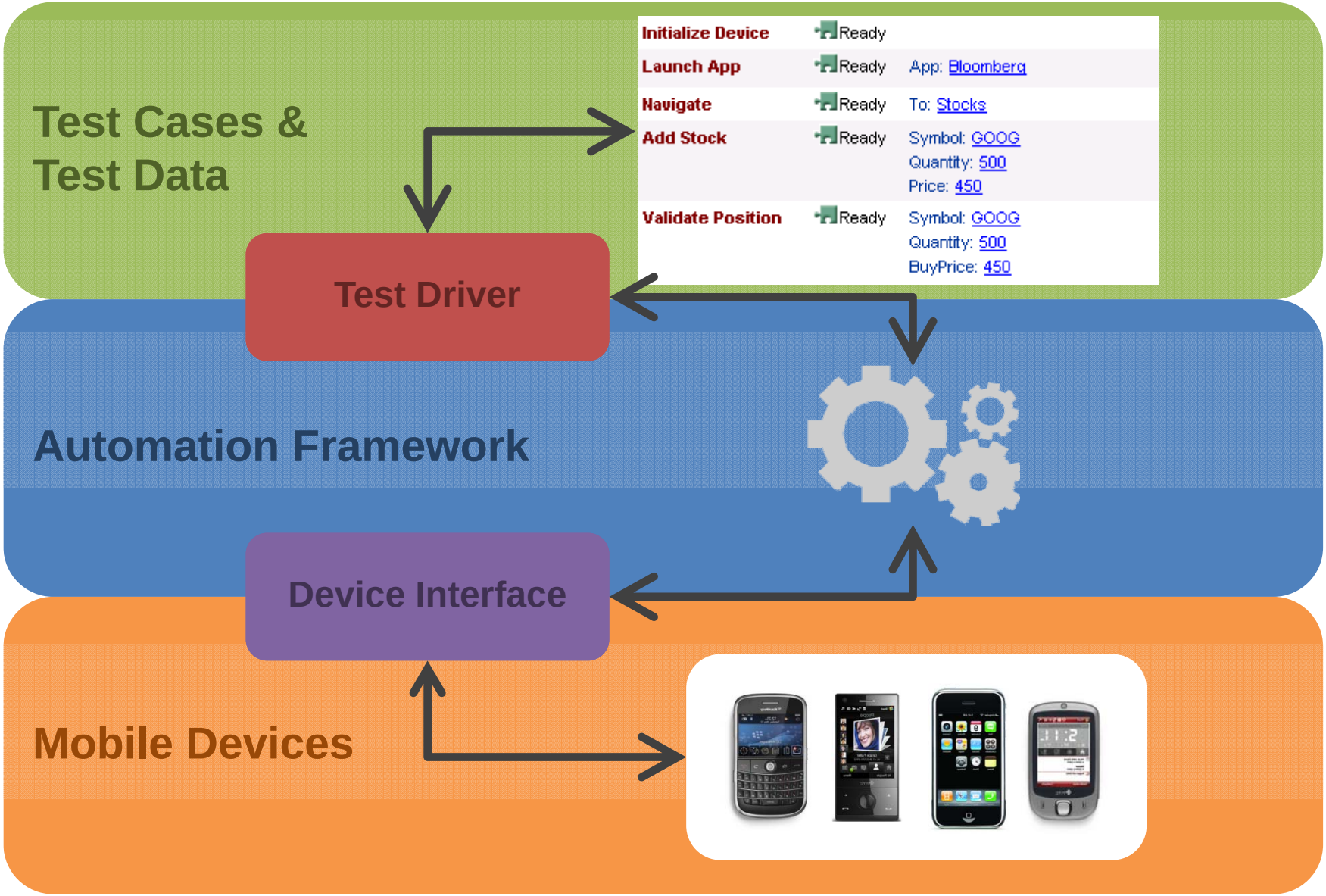
Maintainable

- Minimum sensitivity to application and test case changes
- Test cases separate from automation code

Scalable

- Test coverage expanded efficiently
- Automated test cases created by non-technical resources

Test Automation Architecture



Mobile Automation Technology

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Two Main Approaches

Visual Interaction

- Uses OCR and image recognition to “see” mobile UI
- Test actions are performed with keyboard and user actions (e.g. taps, swipes, etc.)
- Apps must have consistent navigation and UI layout
- Can be unreliable

Object Interaction

- Application interaction performed at the object level
- May require an agent to be compiled into app
- Some tools support object interaction on emulators only
- Platform vendors have capability built into their developer kits

Most tools integrate with commercial / open source automated tools and IDE’s for script development

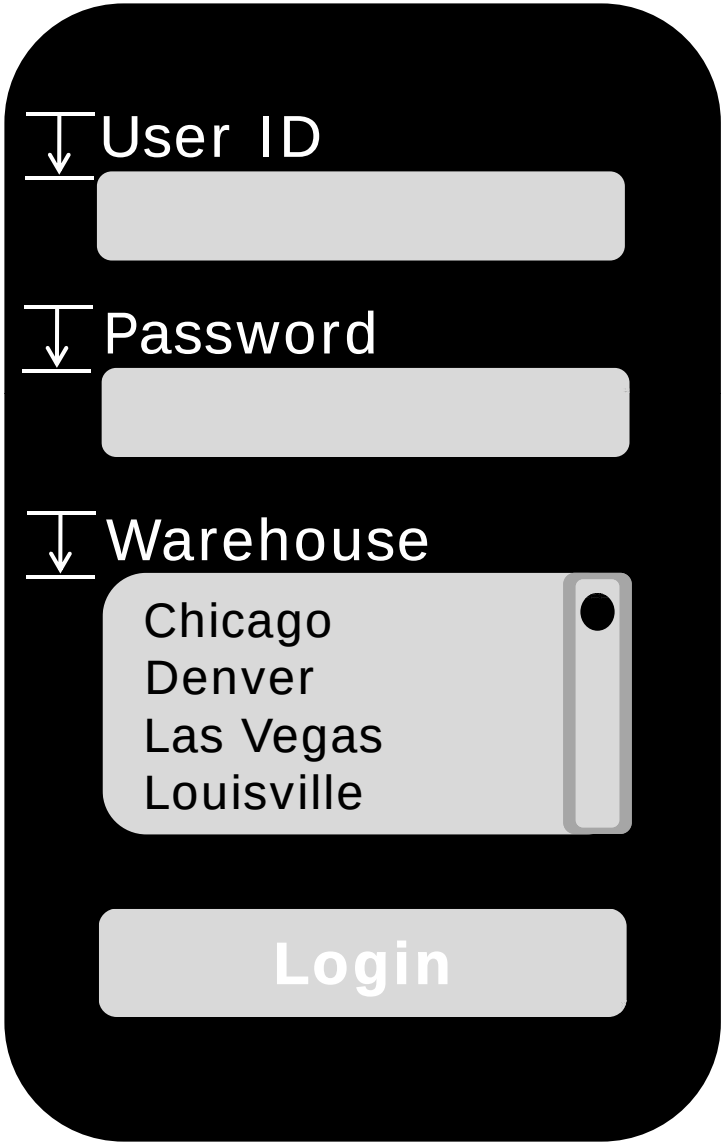
Automation Friendly Apps

General Characteristics

- Business apps (vs. games / multi-media)
- Consistent functionality
- Consistent navigation
- Consistent GUI layout

Visual Interaction Requirements

- UI objects identifiable by text
- Consistent object / object ID relationship
- Lists searchable via keystroke entry



Summary

- Mobile Testing Challenges
  - Platform and device diversity
  - Increased testing burden
  - New environment
- Mobile Testing Practices
  - Understand the mobile landscape
  - Test strategy comes from mobile strategy
  - Tools are available on the mobile platform
- Automation
  - Approach to Automation is the same as traditional apps
  - Tool capabilities vary widely – evaluate carefully

Questions…

…. and Answers!

Direct future questions to:

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